PHASE I BOOK EXPLOITATION SOV/3871

Usovershenstvovaniye konstruktsiy i ekspluatatsii turbinnykh ustanovok; sbornik statey (Improvement in the Construction and Operation of Turbine Units; Collection of Articles) Moscow, Gosenergoizdat, 1959. 300 p. Errata slip inserted. 1,550 copies printed.

Eds. (Title page): Ya. M. Rubinshteyn, Professor, and A. V. [illegible], Corresponding Member, Academy of Sciences USSR; Ed. (Inside book): L. [illegible] Sinel'nikova; Tech. Ed.: P. M. Ananov.

PURPOSE: The book is intended for engineers specializing in the design [illegible] ation of turbine equipment.

COVERAGE: This collection of 22 articles deals with aspects of [illegible] ations, particularly, variations in the heat perfor[illegible] and computation of optimum parameters for gas turbines. [illegible] indices and a number of methods for more accurate determin[illegible] parameters for specific cycles are [illegible]. No personalities are [illegible]. References follow [illegible]

Shyakhin, P.S., and Ya.R. Plotkin. Investigation of the Forces Causing Vibration of Turbine Blades 163

The authors examine the problem of vibration of turbine blades when such vibrations are induced by flow irregularity. [illegible] of the frequency of vibration on structural characteristics of blading as well as on the nature of flow [illegible] Optimum designs for lacing wires and shrouds [illegible]

Zaydel'man, R.L. Comparative Analysis of the Damping Properties of Shrouding and Types of Wire Binding 172

Methods of fastening shrouds to buckets and types of lacing are analyzed with respect to vibration-damping efficiency. Curves are plotted indicating the dependence of damping properties on impact force.

Zaydel'man, R. L. Determination of the Logarithmic Decrements for Vibration Damping by Measuring the Frequency of Natural Vibrations 178

Methods of measuring the natural damping cycle of free vibrations are discussed, and values for the logarithmic decrement are deduced.

Sereshkina, L.P. Some Results of an Experimental Investigation of Michell-Type Thrust Bearings 182

The article deals with test stands and methods of testing Michell journal-type thrust bearings. Several lubrication systems are described with reference to service reliability and minimum friction losses.

Berman, L.D., and S.N. Fuks. Improved Sealing of Condenser Tubes in Steam Turbines 209

The article discusses and evaluates several methods and coating materials for protecting condensers from direct impingement of the steam. Several arrangements for "packing" tube ends into tube sheets and for sealing water boxes are evaluated.

Singer, E.M. Methods of Designing Jet Condensers 219

Arrangements of multijet ejector condensers and layouts of stages are discussed and design and calculation methods given.

Molchanov, Ye.I., G.G. Ol'khovskiy, and G.I. Shnyalev. Results of Final Adjustment and Testing of a 1,500-kw Gas Turbine Plant 237

Pre-operational testing of a GT-600-1.5 turbine is described.

Molchanov, Ye.I. Selection of the Starting Procedure for a Gas Turbine 255

Molchanov, Ye.I. Experimental Stand for Testing Gas-Turbine Rotors for Thermal Fatigue 261

Allowable thermal-fatigue values and stress-distribution patterns for certain rotor elements with respect to their elasticity range are discussed.

Sharovskiy, A.V. Optimal Parameters for Inlet Temperatures in Multistage Gas-Turbine Plants 265

The problem of cycle temperatures versus pressure ratios per individual stage is discussed. Several methods for selecting the optimal thermal-efficiency regime are evaluated.

Polynovskiy, Ya.L. Determination of the Most Effective Parameters for the Regeneration Cycle of a Gas-Turbine Plant 275

The author presents his own method of computation, applicable to a stationary plant, to determine the elements of regenerator effectiveness. The method can also be used for regenerators with cross-flow arrangement.

AVAILABLE: Library of Congress

SOV/96-59-10-3/22

AUTHORS: Ol'khovskiy, G.G. (Engineer) and
Shuvalov, G.I. (Cand. Tech. Sci.)

TITLE: Test Results on a Gas Turbine Type GT-12-3 Installed in the Shatskaya Station of Podzemgaz (Underground Gasification)

PERIODICAL: Teploenergetika, 1959, Nr 10, pp 17-22 (USSR)

ABSTRACT: The first Soviet tandem gas turbine of 12 MW, made by the Leningrad Metal Works, designed to operate on liquid fuel and gas from the underground gasification of Moscow Basin coal, was tested in February 1958. A schematic circuit diagram of the installation is given in Fig 1. The commissioning of this set is considered to be an important stage in the development of Soviet gas turbines. Experience with tandem sets of this kind will provide a basis for the development of high-output gas turbines for power stations. Acceptance tests were carried out at no-load and at 4, 8 and 12 MW. The performance of the set is not yet fully up to the designer's expectations; it has not been run on its principal fuel, which is gas from the underground gasification of coal, and a number of design faults remain to be corrected. However, the experience so far gained enables the works to design and start manufacturing a 25 MW set and to commence the design of a

Card 1/5

Test Results on a Gas Turbine Type GT-12-3 Installed in the Shatsk Station of Podzemgaz (Underground Gasification)

100 MW set, which should be a serious competitor to steam sets of comparable output. The places at which measurements were made during the tests are indicated in the schematic diagram of Fig 1; the instrumentation and measurement procedures are described. Power and heat balances derived from the test results are given in Table 1 and show that the tests were accurate to within 1 or in some cases 2%. Graphs of efficiency, fuel consumption and main temperatures as functions of load are given in Fig 3. Graphs of pressures, consumption and speed of the high-pressure turbine as functions of load are in Fig 4. The graphs show that under all conditions of loading the performance is very close to the design requirements. The main test results, given in Table 2, show that at a load of 11.4 MW the efficiency is only 23.4%, which is appreciably lower than the design figure of 27%. This occurs because the degree of regeneration is less than it should be; also there are considerable air leakages at the glands and the compressor efficiencies are somewhat low. When these defects have been corrected

Test Results on a Gas Turbine Type GT-12-3 Installed in the Shatsk Station of Podzemgaz (Underground Gasification)

the efficiency may be raised to 27% at an electrical load of more than 13 MW. This set is of lower designed efficiency than foreign sets of comparable output because it contains a group of comparatively inefficient centrifugal gas compressors and because the gas ducts are long owing to the complicated layout of the machine and regenerator. It will be seen from Fig 3 that the efficiency at half load is three quarters of the maximum efficiency and the fuel consumption at no-load is a third of that at full load. The efficiencies of the high-pressure compressors are some 5-8% low because the air that they receive from the coolers contains drops of condensed water. In addition to affecting the thermodynamic properties of the compressor, this moisture promotes deposit formation on the blade. Methods of overcoming this difficulty are suggested. When the machine comes to work on gas, the compressors will not develop as high a pressure as when working on air, and will probably deliver insufficient gas to the combustion chamber. It is, therefore, necessary to increase the compression ratio of the medium- and low-pressure groups of gas compressors.

Card 3/5

Test Results on a Gas Turbine Type GT-12-3 Installed in the Shatsk Station of Podzemgaz (Underground Gasification)

The air consumption at the glands is 7.3 tons per hour, or 2.5% of the total air flow, which is much too big. The heavy rigid construction of the turbine frame has certain disadvantages, and in particular the set takes about five hours to warm up, so that the starting time cannot be reduced to 10-30 minutes as is common in foreign practice. The casing takes much longer to heat up than the shaft and rotor. Data are given about thermal expansiion and temperature differences during starting. During the tests the set ran on diesel fuel and the combustion efficiency was high. However, there was a certain amount of coke formation in the combustion chamber and some pieces of coke were carried over into the turbine. Moreover, the temperature distribution at the turbine inlet was not uniform. The degree of regeneration obtained during the tests was only 66.2% against a designed figure of 80%, mainly because the air was not sufficiently heated in the heaters. It is probable that part of the heating gases by-pass the heating surface. The air and gas coolers operated satisfactorily.

SOV/96-59-10-3/22

Test Results on a Gas Turbine Type GT-12-3 Installed in the Shatsk Station of Podzemgaz (Underground Gasification)

It is concluded that the set can now operate satisfactorily at full load on liquid fuel, though the efficiency is not up to the design figure. This is a considerable success for the Leningrad Metal Works but they still have a good deal of work to do to achieve the designed performance and to get the set running on its principal fuel, gas.

Card 5/5

There are 4 figures and 2 tables.

ASSOCIATION: Vsesoyuznyy teplotekhnicheskiy institut (All-Union Thermo-Technical Institute)

UVAROV, Vladimir Vasil'yevich; CHERNOBROVKIN, Aleksey Petrovich; SHUVALOV, G.I., kand. tekhn. nauk, retsenzent; SHAPIRO, M.S., kand. tekhn. nauk, red.; DANILOV, L.N., red. izd-va; SOROKINA, G.Ye., tekhn.red.; DOBRITSYNA, R.I., tekhn. red.

[Gas turbines] Gazovye turbiny. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1960. 140 p. (MIRA 14:7)
(Gas turbines)

KOSTYUK, A.G., kand.tekhn.nauk; SHUVALOV, G.I.

Use of gas-turbine systems in large power plants. Teploenergetika 8 no.5:3-6 My '61. (MIRA 14:8)
(Gas turbines)

SHUVALOV, G.I., kand.tekhn.nauk

Atlas on the design and schematics of gas-turbine systems.
Teploenergetika 8 no.5:96 My '61. (MIRA 14:8)
(Gas turbines)

L 39493-65 EWT(d)/EPA/EWT(m)/EWP(w)/EWP(f)/EPF(n)-2/EWP(v)/EPR/T-2/EWP(k)/EPA(bb)-2/EWA(c) Pae-4/Pf-4/Ps-4 WW/EM

ACCESSION NR: AP5011721 UR/0096/64/000/009/0002/0006

AUTHOR: Shuvalov, G. I. (Candidate of technical sciences); Ol'khovskiy, G. G. (Engineer)

TITLE: Development of stationary gas turbines in USSR

SOURCE: Teploenergetika, no. 9, 1964, 2-6

TOPIC TAGS: gas turbine engine, electric power engineering

Abstract: This article contains 1) a survey of foreign-built stationary gas turbines during the 1955-1961 period; 2) a survey of foreign gas turbine electric power plants; 3) a survey of the properties of the first generation (1955) of Soviet Stationary gas turbines GT-600-1,5; GT-700-4; PG-50000, and GT-12-3; 4) a survey of the properties of the post-1960 Soviet production (GT-25-700, GT-50-800, GTN-5-70C, and GTN-9-750); and 5) a discussion of the fuel, compression, and cooling problems.

Card 1/2

L 39493-65

ACCESSION NR: AP5011721

ASSOCIATION: Vsesoyuznyy teplotekhnicheskiy institut (All-Union Heat Engineering Institute)

SUBMITTED: 00 ENCL: 00 SUB CODE: EE

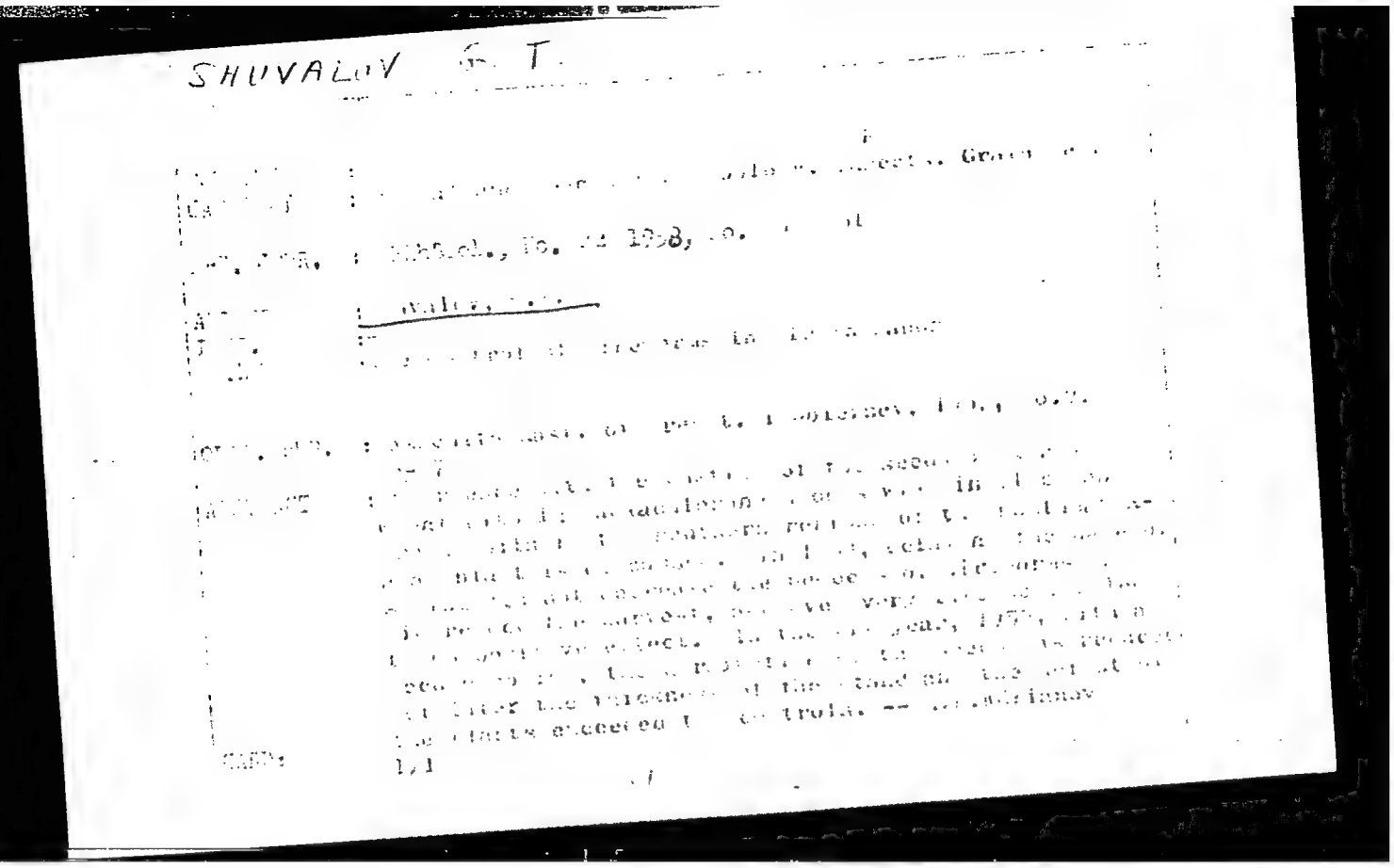
NO REF SOV: 008 OTHER: 000 JPRS

Card 2/2

SHVALOV, I. .

"Preparatory Treatment of Cereal and Buckbean Plantings With Hexachlorane as a Protection Against Pests in the Chuvash ASSR." Cent Agr Sci, All-Union Sci Res Inst of Plant Protection, Leningrad, 1954. (RZhKhim., No 17, Sep 54)

SO: Sum. 432, 29 Mar 55



SHUVALOV G. T.

SHUVALOV, G. T.

SHUVALOV, G.T.; KIRNOS, T.V.

Rate of wireworm infestations in fields tilled by T.S. Mal'tsev's method. Agrobiologiia no.2:124-125 Mr-Ap '57. (MLRA 10:5)

1.Kustanayskiy opornyy punkt Vsesoyuznogo instituta zashchity rasteniy, Karabalykskaya gosudarstvennaya selektsionnaya stantsiya. (Karabalykskiy District--Wireworm)
(Tillage)

SHUVALOV, G.T., kand.sel'skokhozyaystvennykh nauk

Effectiveness of tillage in wireworm control. Zashch.rast.ot vred.i bol. 4 no.3:29-30 My-Je '59. (MIRA 13:4)
(Wireworms) (Tillage)

SHUVALOV, G.T.

Role of cultivation practices in the control of the cutworm Hadena basilinea. Zemledelie 23 no. 2:19-26 F '61.
(MIRA 14:2)

1. Kustanayskiy opornyy punkt Vsesoyuznogo nauchno-issledovatel'skogo instituta zashchity rasteniy.
(Grain—Diseases and pests) (Cutworms)

SHUVALOV, G.T., kand.sel'skokhoz.nauk

Some conditions for large-scale multiplication of the gray grain moth. Zashch.rast.ot vred.i bol. 5 no.3:42-43 Mr '60. (MIRA 16:1)

(Kustanay Province--Grain--Diseases and pests)
(Kustanay Province--Moths)

L 10727-63 EWA(k)/EWP(j)/EWT(l)/EWP(q)/EWT(m)/BDS/FBD/T-2/3W2/ES(t)-2/
EEC(b)-2 AFFTC/ASD/ESD-3/RADC/APGC/AFWL Pc-4/Po-4/Pl-4 RM/WH/LJP(C)/WG/K/EH/JHB

ACCESSION NR: AP3003161 S/0056/63/044/006/2193/2194

AUTHOR: Danil'tseva, G. Ye.; Zubov, V. A.; Sushchinskiy, M. M.; Shuvalov, I. K.

TITLE: Application of the laser to the study of Raman spectra of dye powders

SOURCE: Zhurnal eksper. i teor. fiziki, v. 44, no. 6, 1963, 2193-2194

TOPIC TAGS: laser applications, Raman spectra, dye powders

ABSTRACT: A 6943 Å ruby laser has been applied to the study of Raman spectra in dye powders. A spectrograph with a diffraction grating of 600 lines/mm was used in the investigation. A lens focused the laser light on the powder samples, which were placed directly before the slit of the spectrograph. A low-power cryogenic ruby laser with 1—1.8 kilojoule pumping power was used; 30—100 flashes were required for photographic registration at gap widths of 0.07—0.1 mm, which constitutes 8—12 cm^{-1} in the given spectral region. Tests conducted with a number of different powders including 4, 4'-azoxyanisole

Card 1/2

L 10727-63

ACCESSION NR: AP3003161

3

(bright yellow) and anisal-para-aminoazobenzene (red) showed that lasers are quite suitable for studying Raman spectra of dye powders. "The authors thank M. D. Galanin and A. M. Leontovich for the use of their ruby laser." Orig. art. has: 1 figure.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Institute of Physics, Academy of Sciences SSSR)

SUBMITTED: 12Apr63 DATE ACQ: 23Jul63 ENCL: 00

SUB CODE: 00 NO REF SOV: 000 OTHER: 001

Card 2/2

L 64712-65 EWT(1)/T IJP(c)

ACCESSION NR: AR5012273 UR/0058/65/000/003/D045/D045

SOURCE: Ref. zh. Fizika, Abs. 3D346

AUTHOR: Danil'tseva, G. Ye.; Zubov, V. A.; Sushchinskiy, M. M.; Shuvalov, I. K.

TITLE: Investigation of the Raman spectra of powders in a wide spectral region

CITED SOURCE: Tr. Komis. po spektroskopii, AN SSSR, vyp. 1, 1964, 696-703

TOPIC TAGS: Raman spectrum, spectrographic analysis

TRANSLATION: Methods are proposed for producing and analyzing the Raman spectra of powders. These methods are designed for eliminating the effect which the degree of powder dispersion, absorption of light in the powder, and other factors have on the intensity of the Raman lines. Theory and experiment are compared. Methods are described for studying powders in a wide spectral range, using various lines of mercury and cadmium as well as a ruby laser for excitation of Raman spectra. The various methods for producing Raman spectra are compared.

SUB CODE: OP ENCL: 00

Card 1/1

ACCESSION NR: AP4041128 S/0053/64/083/002/0197/0222

AUTHOR: Zubov, V. A.; Sushchinskiy, M. M.; Shuvalov, I. K.

TITLE: Stimulated Raman scattering of light

SOURCE: Uspekhi fizicheskikh nauk, v. 83, no. 2, 1964, 197-222

TOPIC TAGS: laser, Raman effect, Raman laser, stimulated Raman scattering, Raman laser material

ABSTRACT: The current state of theoretical and experimental work aimed at achieving Raman-effect laser action is presented in a comprehensive review based mainly on Western sources. The principal experimental results are considered for two cases: where the scattering material is located inside and where it is located outside the Fabry-Perot interferometer. In the latter case, particular attention is paid to the types of laser emission falling in the Stokes and anti-Stokes frequency regions. Discussion of the latest experiments is backed up by a theoretical exposition in terms of semiclassical and quantum interpretations of Raman-effect laser action.

Card 1/2

L 8946-65 EWA(k)/EWT(l)/EWT(m)/EPF(c)/EEC(k)-2/K/EWP(j)/T/EEC(b)-2/EWP(k)/
EWA(m)-2 Pc-4/Po-4/Pf-4/Pr-4/Pi-4/Pl-4 LJP(c)/ESD(t) WG/JHB/RM

ACCESSION NR: AP4043665 S/0056/64/047/002/0784/0785

AUTHOR: Zubov, V. A.; Sushchinskiy, M. M.; Shuvalov, I. K. B

TITLE: Investigation of the excitation threshold for stimulated Raman scattering 21

SOURCE: Zh. eksper. i teor. fiz., v. 47, no. 2, 1964, 784-785

TOPIC TAGS: Raman scattering, combination scattering, stimulated Raman scattering, stokes line, induced Raman scattering

ABSTRACT: The threshold of excitation of stimulated Raman scattering and pertinent line parameters of ordinary Raman scattering were determined for the following five compounds: benzene, 1,3-pentadiene, 3-methyl—1,3 butadione, carbon disulfide, and styrene. A ruby laser with a rotating Q spoiler was used as the source of excitation (wavelength of 6943Å) of stimulated Raman scattering, the spectra of which were recorded with a spectrograph having a diffraction grating (dispersion of about 13 Å/mm). A photoelectric spectrometer with a dispersion of about 5 Å/mm was used to measure the parameters of ordinary Raman scattering excited by a mercury line at the wavelength

Card 1/2

L 8946-65

ACCESSION NR: AP4043665

2

of 4358 Å. In compounds with a relatively low excitation threshold and conjugated C = C bonds, the stimulated Raman scattering lines were observed in the 1600 cm^{-1} region. The materials investigated represent a new class of active, stimulated Raman scattering compounds in which the pi-electrons are not in the cyclic systems. The threshold for stimulated Raman scattering is determined mainly by the line intensity of standard Raman scattering and is practically independent of the degree of depolarization. A considerable increase in line intensity of stimulated Raman scattering was observed for only a small increase of excitation energy over the threshold value. Two lines at 998 and 1634 cm^{-1} were observed simultaneously in the stimulated Raman spectra of styrene. Orig. art. has: 1 table.

ASSOCIATION: Fizicheskiy institut imeni P. N. Lebedev Akademii nauk SSSR (Physics Institute, Academy of Sciences SSSR)

SUBMITTED: 05Jun64 ATD PRESS: 3107 ENCL: 00

SUB CODE: OP NO REF SOV: 001 OTHER: 001

Card 2/2

L 7071-66 EWA(k)/FBD/EWT(l)/EWP(e)/EWT(m)/EEC(k)-2/EWP(i)/T/ EWP(k)/EWA(m)-2/
ACC NR: AP5026319 EWA(h) SCTB/IJP(c) SOURCE CODE: UR/0368/65/003/004/0336/0341
WH/WG

AUTHOR: Zubov, V. A.; Sushchinskiy, M. M.; Shuvalov, I. K. 44 44 44

ORG: none

TITLE: An investigation of stimulated Raman scattering

SOURCE: Zhurnal prikladnoy spektroskopii, v. 3, no. 4, 1965, 336-341

TOPIC TAGS: Raman scattering, Stokes component, Raman laser, stimulated emission, laser 25,44

ABSTRACT: An experimental investigation was conducted of stimulated Raman scattering in benzene, bromobenzene, chlorobenzene, toluene, pyridene, o-xylene, styrene, 1,3-pentadiene, 2-methyl-1,3-butadiene, carbon disulfide, carbon tetrachloride, and nitrobenzene. The dependence of the intensity of the first Stokes component on the properties of the scatterer, the concentration of its molecules, and the intensity of the excited light (from a Q-spoiled ruby laser) was investigated. It was established that, unlike spontaneous Raman scattering, the line intensity of stimulated Raman scattering is an exponential and not a linear function of the intensity of the exciting light and the concentration of the scattering molecules. The exponential variation is in agreement with a simplified theory developed by the authors for the case when the intensity of exciting light slightly exceeds the excitation threshold. In the first approximation the inverse of the excitation threshold is a quadratic

Card 1/2 UDC: 535.32

L 7071-66

ACC NR: AP5026319

function of the concentration of the scattering molecules. Orig. art. has: 14 formulas, 3 figures, and 1 table. [CS]

SUB CODE: SS/ SUBM DATE: 20Jan65/ ORIG REF: 002/ OTH REF: 002/ ATD PRESS: 4144

BW

Card 2/2

L 31827-65 EWG(j)/EWA(k)/FBD/EWT(l)/EEC(k)-2/EEC(b)-2/EWP(k)/EEC(t)/T/
EWA(h)/EWA(m)-2 Pf-4/Pi-4/Pl-4/Pn-4/Po-4/Peb IJP(c) WG/GG
ACCESSION NR: AP5004415 S/0056/65/048/001/0378/0380

55
51
B

AUTHOR: Zubov, V. A.; Sushchinskiy, M. M.; Shuvalov, I. K.

TITLE: Investigations of stimulated Raman scattering in mixtures

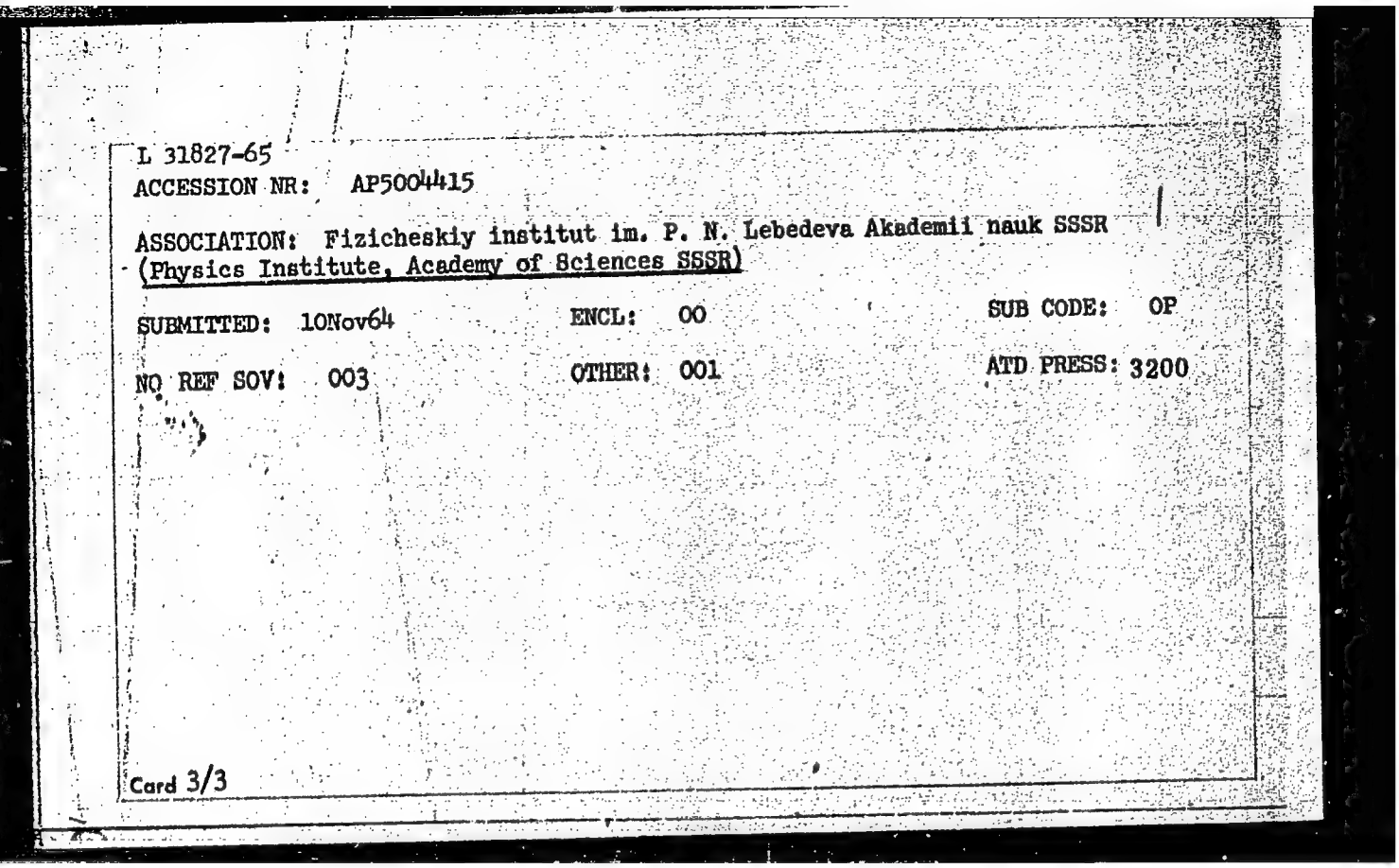
SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 48, no. 1, 1965, 378-380

TOPIC TAGS: carbon disulfide, benzene, Raman scattering, excitation threshold, stimulated emission, Raman laser

ABSTRACT: A report is presented of an experimental investigation of the excitation threshold and line intensity of stimulated Raman scattering. A study was made of the dependence of these quantities on the concentration of the investigated medium in mixtures of carbon disulfide and benzene, and also of the dependence of the intensity of the Raman lines on the intensity of the exciting light. The results show that the reciprocal of the excitation threshold is proportional, within the limits of experimental error, to the square of the concentration of the carbon disulfide in the mixture. By combining

Card 1/3

this result with the previously obtained dependence of the threshold on the line intensity in ordinary Raman scattering, a formula is derived for the concentration dependence of the threshold. The dependence of the intensity of the stimulated Raman scattering spectrum lines on the intensity of the exciting light was investigated by the method of photographic photometry. The measurements have shown that the intensity of the stimulated Raman scattering lines is determined by the excess of the intensity of the exciting light over the threshold. The intensity was found to be approximately proportional to the square of the concentration of the given component in the case of mixtures. The result can be written in the form of a general formula $I = Bc^2f(x)$, where B is a constant for the given experiment, and the function $f(x)$ can be described with sufficient accuracy by $f(x) = e^{kx} - 1$, where k is a coefficient that depends on the choice of measurement units and is the excess of the intensity of the exciting light over the threshold. The observed nonlinear relation between the radiation intensity and the number of particles tends to favor the hypothesis that a quadratic dependence of the intensity on the number of particles is characteristic of any stimulated emission, independently of the particle interaction. "We thank P. A. Bazhulin, N. G. Basov, and A. M. Prokhorov for interest in the work." Orig. art. has: 2 figures and 4 formulas. [02]



L 31827-65
ACCESSION NR: AP5004415

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute, Academy of Sciences SSSR)

SUBMITTED: 10Nov64 ENCL: 00 SUB CODE: OP

NO REF SOV: 003 OTHER: 001 ATD PRESS: 3200

Card 3/3

L 38.21-66 EWT(1)

ACC NR: AP6024868 SOURCE CODE: UR/0056/66/051/001/0101/0107

55
B

AUTHOR: Zubova, N. V.; Kuz'mina, N. P.; Zubov, V. A.; Sushchinskiy, M. M.; Shuvalov, I. K.

ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences SSSR (Fizicheskiy institut Akademii nauk SSSR)

TITLE: Intensity distribution in stimulated Raman scattering spectra

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 51, no. 1, 1966, 101-107

TOPIC TAGS: raman scattering, ~~nonlinear~~ laser optics, laser, light

ABSTRACT: The line intensity of stimulated Raman scattering spectra (SRS) was experimentally investigated as a function of the exciting light intensity. The measurements were conducted in a region of intensities above and below the experimental threshold for a single flash. The intensity distribution in SRS spectra was investigated for several Stokes and anti-Stokes components. The existence of a considerable wing accompanying each component was detected. A structure of the first Stokes component of SRS was found and was investigated in the threshold region and below the threshold. Orig. art. has: 7 formulas and 4 figures. [CS]

SUB CODE: 20/ SUBM DATE: 21Feb66/ ORIG REF: 008/ OTH REF: 002/ ATD PRESS: 5043

Card 1/1

L 30408-66 EWT(1) IJP(c)

ACC NR: AP6017864 SOURCE CODE: UR/0053/66/089/001/0049/0088

59

B

AUTHOR: Zubov, V. A.; Sushchinskiy, M. M.; Shuvalov, I. K.

ORG: Physics Institute im. P. N. Lebedev, AN SSSR (Fizicheskiy institut AN SSSR)

TITLE: Modern trends in Raman spectroscopy 2/

SOURCE: Uspekhi fizicheskikh nauk, v. 89, no. 1, 1966, 49-88

TOPIC TAGS: Raman spectroscopy, laser application, Raman scattering, stimulated emission, SPECTROPHOTOMETRIC ANALYSIS

ABSTRACT: The authors review recent trends in Raman spectroscopy which are only briefly mentioned in previous survey articles. Fundamentally new methods are described for producing and studying Raman spectra. Spectrophotometric systems for registration of Raman spectra are divided into two categories: 1. systems for electrical division of the signals received from the scatterer (the signal to be measured) and those received directly from the excitation source (the comparison signal); 2. systems for optical division. The operating principles of each class of systems are discussed as a basis for explaining their advantages and disadvantages. Methods and equipment are described for photoelectric registration of Raman spectra generated by pulsed excitation and the theoretical superiority of this method over continuous excitation is discussed. The greatest possibilities for practical application of the pulsed

UDC: 535.36

Card 1/2

L 30408-66

ACC NR: AP6017864 O

method are in high-speed Raman spectroscopy. The difference method for recording Raman spectra is considered as well as the registration of spectra which are differentiated with respect to frequency. Equipment and methods using laser technology for producing Raman spectra are described with particular emphasis on the progress which has been made with the improvement of continuous gas lasers. The rapidly developing field of stimulated Raman scattering is discussed and research on this type of scattering by materials in various states of aggregation is reviewed. The present state of the art in experimental technology indicates that stimulated Raman scattering lines may be obtained for nearly any material in any state of aggregation. Theoretical and experimental data are given on the spatial distribution of stimulated Raman scattering together with some of the energy characteristics and nonlinear effects associated with this phenomenon. The latest research in this field has opened up new possibilities for using this type of emission to amplify light signals in a broad spectral range. Orig. art. has: [28] 28 figures, 6 tables, 21 formulas.

SUB CODE: 20/ SUBM DATE: none/ ORIG REF: 023/ OTH REF: 051/ ATD PRESS: 5017

Card 2/2 nc

STOLYAROV, N.I.; SHUVALOV, I.M., inshener.

New pump for liquid argon. (Argon) Kislorod 10 no.1:33-34 '57. (MIRA 10:11)
(Pumping machinery)

SHUVALOV, I.S.

Friction cutting of metals. Biul. TSIIN tsvet. met. no.1:31-33 '58.
(Metal cutting) (Friction) (MIRA 11:4)

VOLKOV, Aleksey Trofimovich; SHUVALOV, Konstantin Ivanovich; IVANITSKIY, S.Yu., inzh., red.; LEZHNEVA, Ye.I., red.izd-va; UVAROVA, A.F., tekhn.red.

[Motorscooters] Motorollery. Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit.lit-ry, 1959. 255 p. (MIRA 12:3)
(Motorscooters)

SHUVALOV, Konstantin Ivanovich; KLYUCHEV, V.I., red.; SHIROKOVA, M.M., tekhn.red.

[Simplest networks for the automatic control of electric drives] Prosteishie skhemy avtomaticheskogo upravleniia elektroprivodami. Moskva, Gosenergoizdat, 1961. 47 p. (Biblioteka elektromontera, no.55) (MIRA 15:5)

(Electric driving) (Automatic control)

SOV-111-58-10-16/29

AUTHOR: Shuvalov, K.S., Chief Engineer

TITLE: Mechanization of Production Processes in the Moscow Department of Mail Transportation in the Kursk Railroad Station (Mekhanizatsiya proizvodstvennykh protsessov v Moskovskom otdelenii perevozki pochty na Kurskom vokzale)

PERIODICAL: Vestnik svyazi, 1958, Nr 10, pp 22-24 (USSR)

ABSTRACT: At the Kursk Railroad Station in Moscow 27,000 parcels weighing 200 tons, including 63 tons of printed matter and 30 tons of letters, are handled daily. In 1965, this will rise to 400 tons of parcels, 150 tons of printed matter and 40 tons of letters. For the mechanization of this work, a conveyer 16 m long and 60 cm wide has been installed for transporting the parcels within the storehouse, and 4 conveyers 2.8 m long and 30 cm wide for loading parcels on trucks. In the storehouses, roller conveyers (Figure 2) are used for unloading the parcels from the cars to the storerooms. In the railroad station, the platforms have been raised to the height of the railroad cars and freight elevators have been installed (Figure 3). All platforms and storehouses are equipped with signal devices, telephones, loudspeakers, etc. It is planned to build a three-storied storehouse with special

Card 1/2

SOV-111-58-10-10/29

Mechanization of Production Processes in the Moscow Department of Mail Transportation in the Kursk Railroad Station

devices for sorting parcels, to install two freight elevators, a crane for loading and unloading, etc.
There are 5 photos.

ASSOCIATION: Moskovskoye OPP na Kurskom vokzale (Moscow OPP at the Kursk Railroad Station)

1. Railroads--USSR 2. Railroads--Equipment 3. Mail--Transportation

Card 2/2

AGAREV, Yevgeniy Mikhaylovich; MEDOVAR, Lazar' Yefimovich; SHUVALOV, L.A., kand. fiz.-matem. nauk, nauchnyy red.; KAPLUN, M.S., red.; EL'KINA, E.M., tekhn. red.

[Electronic indicators for refrigerator compressors]Elektronnye indikatory dlia kholodil'nykh kompressorov; nauchnoe soobshchenie. Moskva, Gostorgizdat, 1962. 54 p. (MIRA 16:3)
(Compressors)
(Refrigeration and refrigerating machinery)

ZHELUDEV, I.S.; SHUVALOV, L.A.

Seignettoelectric phase transitions and the symmetry of crystals. (MLRA 10:5)
Kristallografiia 1 no.6:681-688 '56.

1.Institut kristallografii AN SSSR.
(Crystals--Electric Properties)
(Ferroelectric substances)

SHUVALOV, L. A.

USSR/Electricity - Semiconductors

Abs Jour : Referat Zhur - Fizika, No 5, 1957, 12140

Author : Zheludev, I.S., Shuvalov, L.A.

Inst : -

Title : Concerning the Symmetry and Physical Properties of a Polydomain Crystal of Rochelle Salt.

Orig Pub : Tr. In-ta kristallogr. AN SSSR, 1956, vyp. 12, 59-66

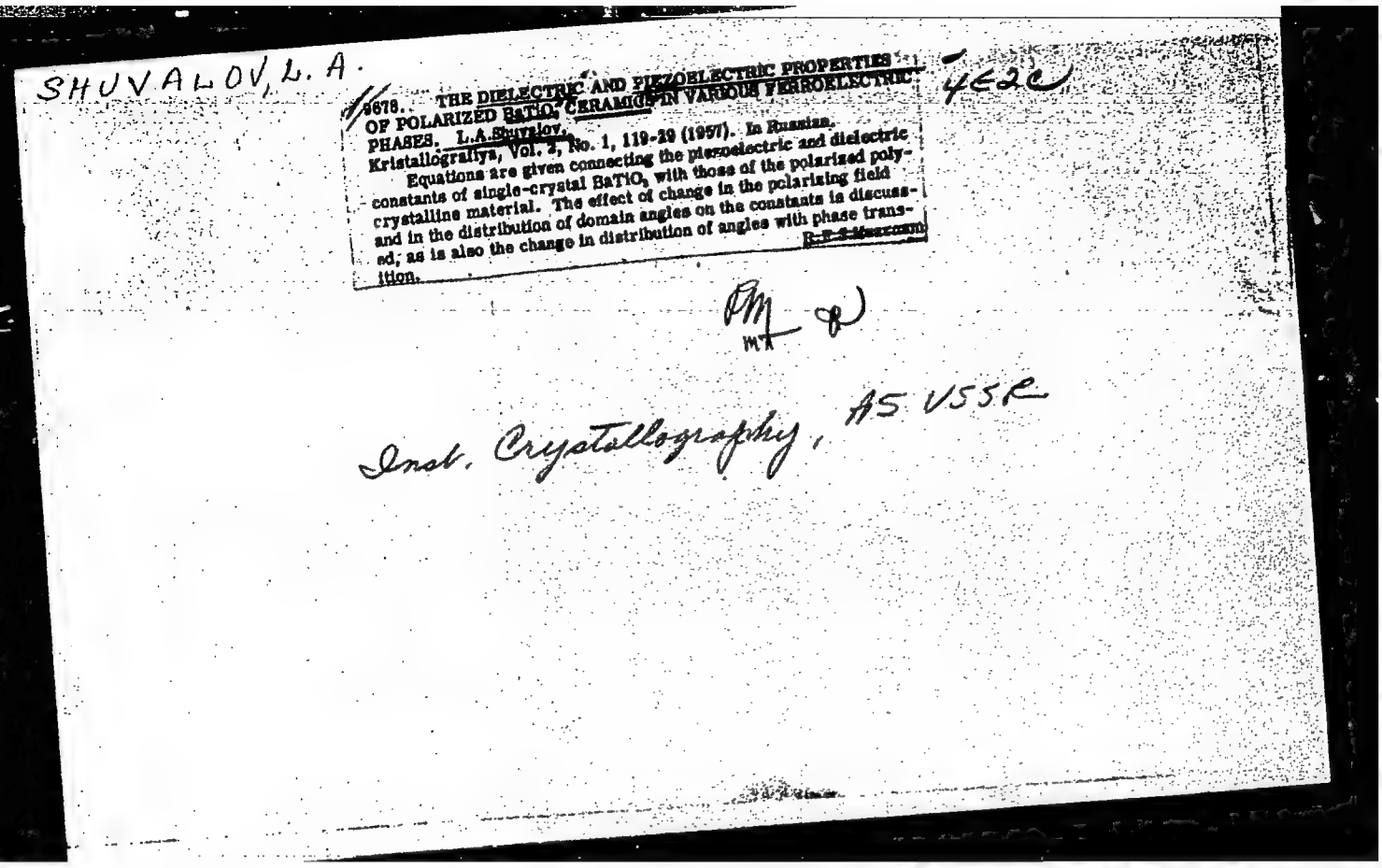
Abstract : The author considers the symmetry of the physical properties of Rochelle salt. The transition of Rochelle salt from rhombic into monoclinic during polymorphic transformation at the upper Curie point is explained from the point of view of the formal theory of symmetry. In the analysis of the physical properties of a polydomain crystal of Rochelle salt, it is concluded that the polydomain crystal of Rochelle salt, being monoclinic, has the same summary (macroscopic) physical properties in the interval between the Curie points as the single crystal of rhombic

Card 1/2

ZHELUDEV, I.S., kandidat fiziko-matematicheskikh nauk; SHUVALOV, L.A.; SHUBNIKOV, A.V., akademik, otvetstvennyy redaktor; SHEFTAL', N.N., doktor geologo-mineralogicheskikh nauk, otvetstvennyy redaktor; KUZNETSOVA, Ye.B., redaktor izdatel'stva; POLYAKOVA, T.V., tekhnicheskiy redaktor

[Crystal growth; reports at the First Conference on the Gorwth of Crystals (March 5-10, 1956)] Rost kristallov; doklady na pervom soveshchanii po rostu kristallov (5-10 marta 1956 g.). Moskva, 1957. 374 p. (MLRA 10:8)

1. Akademiya nauk SSSR. Institut kristallografii.
(Crystallization)



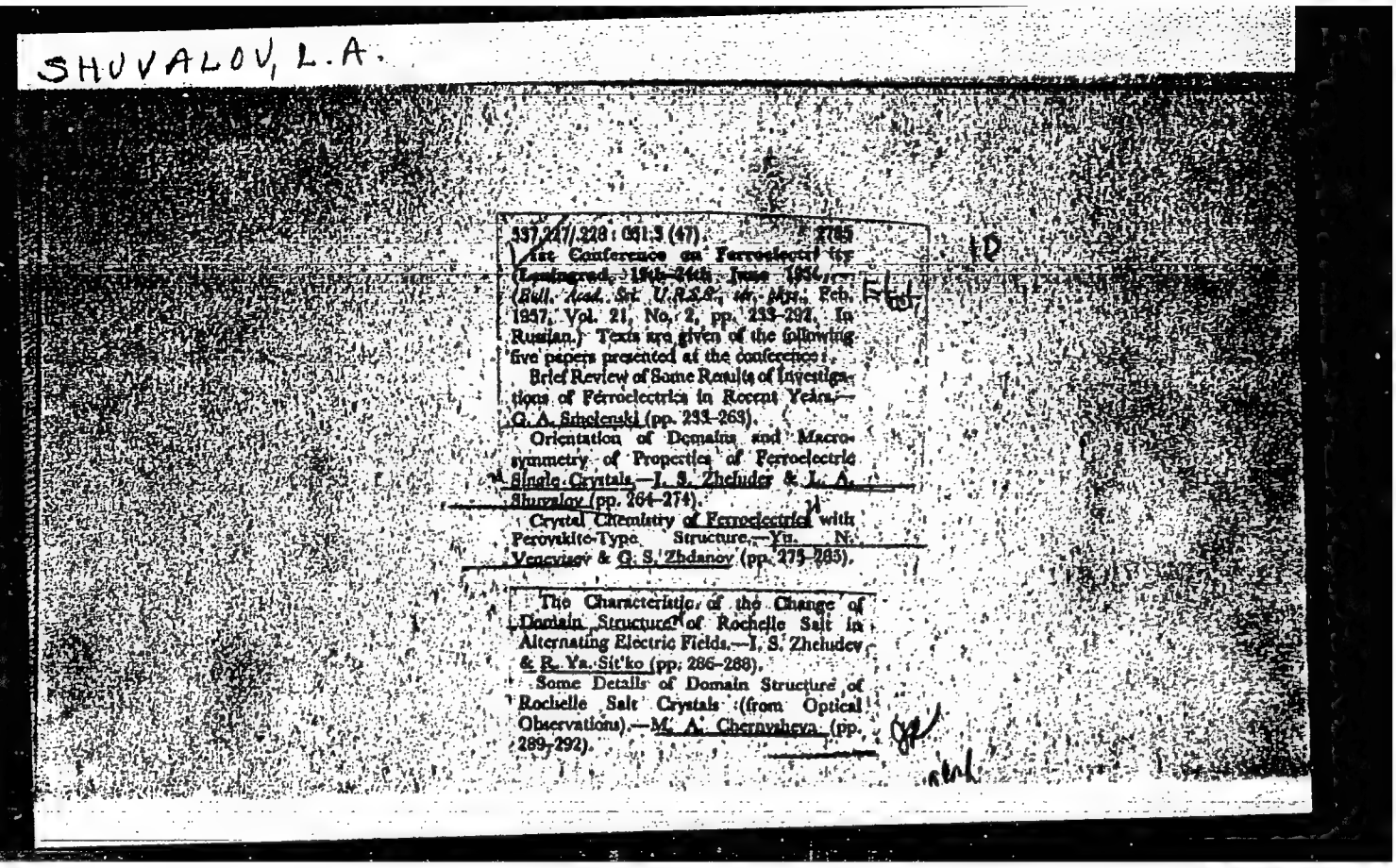
SHUVALOV, L. A.

9678. THE DIELECTRIC AND PIEZOELECTRIC PROPERTIES OF POLARIZED $BaTiO_3$ CERAMICS IN VARIOUS FERROELECTRIC PHASES. L.A. Shuvalov. Kristallografiya, Vol. 2, No. 1, 119-29 (1957). In Russian.

Equations are given connecting the piezoelectric and dielectric constants of single-crystal $BaTiO_3$ with those of the polarized polycrystalline material. The effect of change in the polarizing field and in the distribution of domain angles on the constants is discussed; as is also the change in distribution of angles with phase transition.

4620

Inst. Crystallography, AS USSR



SHUVALOV, L.A.

537.227/.228 : 061.3 (47) 2785

1st Conference on Ferroelectrics (in Leningrad, 19th-24th June 1956). (Bull. Acad. Sci. U.R.S.S., ser. phys., Feb. 1957, Vol. 21, No. 2, pp. 233-292. In Russian.) Texts are given of the following five papers presented at the conference:

Brief Review of Some Results of Investigations of Ferroelectrics in Recent Years.—G. A. Smolenskii (pp. 233-263).

Orientation of Domains and Macrosymmetry of Properties of Ferroelectric Single Crystals.—I. S. Zheludev & L. A. Shuvalov (pp. 264-274).

Crystal Chemistry of Ferroelectrics with Perovskite-Type Structure.—Yu. N. Venevtsev & G. S. Zhdanov (pp. 275-285).

The Characteristic of the Change of Domain Structure of Rochelle Salt in Alternating Electric Fields.—I. S. Zheludev & R. Ya. Sit'ko (pp. 286-288).

Some Details of Domain Structure of Rochelle Salt Crystals (from Optical Observations).—M. A. Chernysheva (pp. 289-292).

Shuvalov, L.A.

AUTHORS: Zheludev, I.S. and Shuvalov, L.A.

TITLE: Domain Orientation and Macrosymmetry of Properties of Ferroelectric Monocrystals (Orientatsiya domenov i makrosimmetriya svoystv segnetoelektricheskikh monokristallov)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Vol. XXl, #2, pp 264-274, 1957, USSR, Seriya fizicheskaya

ABSTRACT: All ferroelectric crystals can be classified into two groups: electrically uni-axial and electrically multi-axial. The electrically uni-axial crystals can have only "longitudinal inversion", i.e., displacement of 180° domain borders. Electrically multi-axial crystals can have, in addition to the longitudinal inversion, also transverse inversion, and some type of multi-axial crystals have several different transverse inversions as well as several longitudinal.

The domain structure, its behavior and a series of the most important properties of ferroelectric monocrystals essentially depend upon the crystal type and its number of spontaneous polarization axes.

Card 1/4

TITLE: Domain Orientation and Macrosymmetry of Properties of Ferroelectric Monocrystals (Orientatisiya domenov i makrosimmetriya svoystv segnetoelektricheskikh monokristallov)

This number is determined by the symmetry type of the initial non-ferroelectric state.

The conclusion is that the domain orientation and the general character of the domain structure are determined by the symmetry of a crystal in its initial non- ferroelectric phase and by the direction of the initial phase along which the spontaneous polarization in the ferroelectric phase arises.

The regulated orientation of domains along one or several axes of spontaneous polarization leads to the fact that a polydomain crystal becomes a polysynthetic twin. The elements of twinning are symmetry elements which the crystal possessed in the initial non-ferroelectric phase, and which are lost during the transition into the ferroelectric phase.

Card 2/4

TITLE: Domain Orientation and Macrosymmetry of Properties of Ferroelectric Monocrystals (Orientatisiya domenov i makrosimmetriya svoystv segnetoelektricheskikh monokristallov)

In view of the determining role of the initial symmetry, it is possible to establish all possible ferroelectric phase transitions for all crystal classes. The known ferroelectric phase transitions are accompanied by changes of crystal symmetry and transitions into another crystallographic class, shown in Table 1.

It can be stated that each ferroelectric phase transition is accompanied by spontaneous deformation, at the boundaries of the ferroelectric region which leads to a change in the crystal symmetry. The reason of this deformation is piezoeffect and/or electrostriction in connection with spontaneous polarization.

After analysis of all crystallographic classes, the possible ferroelectric phase transitions were compiled as shown in Table 2 of the article. All known transitions are in accordance with Table 2. The table enables one to determine the number of all possible ferroelectric phases.

Card 3/4

TITLE: Domain Orientation and Macrosymmetry of Properties of Ferroelectric Monocrystals (Orientatisiya domenov i makrosimmetriya svoystv segnetoelektricheskikh monokristallov)

A photographic recording of phase transitions in $BaTiO_3$ carried out by the author (12) and investigation of their properties have confirmed the general regularities of domain orientations and their boundaries in polydomain ferroelectric monocrystals, as stated in this article.

2 figures and 2 tables are given. The bibliography lists 12 references, 7 of which are Slavic (Russian).

INSTITUTION: Insitutute of Crystallography of the USSR Academy of Sciences

PRESENTED BY:

SUBMITTED: No date

AVAILABLE: At the Library of Congress.

Card 4/4

SOV/70-3-1-24/26

AUTHOR: Shuvalov, L.A.

TITLE: On the Determination of the Piezo-modulus d_{31} from Radial Oscillations of a Disc (K voprosu ob opredelenii p'yezomodulya d_{31} iz radial'nykh kolebaniy diska)

PERIODICAL: Kristallografiya, 1958, Vol 3, Nr 1, pp 106-109 (USSR)

ABSTRACT: It is shown that d_{31} is almost independent of Poisson's ratio σ_{12} in the case of radial oscillations of a disc. When σ_{12} varies between 0.23 and 0.40 the corresponding changes in d_{31} do not exceed 0.4%. This means that even in the case of accurate measurements of d_{31}, using radial oscillations of a disc, there is no need to measure σ_{12}, as is suggested by Bogdanov and Timonin (Ref 2). The following simple approximate formula may be used to determine d_{31} from radial oscillations of a thin metallized disc:

Card1/3

On the Determination of the Piezo-modulus d_{31} from Radial Oscillations of a Disc

$$d_{31} = 0.0907\sqrt{\frac{\Delta f_{ar} e_{33}^{T}}{f_r^3 R^2 \rho}} \qquad (10) .$$

This formula applies provided σ_{12} is between 0.23 and 0.40 and $\Delta f_{ar}/f_r$ is $\ll 1$, where Δf_{ar} is the difference between the resonance and antiresonance frequencies, f_r is the resonance frequency, e_{33}^{T} is the dielectric constant of a free crystal, R is the radius of the disc and ρ is the density. The error introduced by the approximations does not exceed 0.33% in the above range of σ_{12}. The magnitude of the correction factor to Eq (1) is given in Figure 3, in which the factor is plotted as a function of $\Delta f_{ar}/fr$. I.S. Zheludev and S.V. Bogdanov are thanked for a discussion of the results.

SOV/70-3-1-24/26

On the Determination of the Piezo-modulus d_{31} from Radial Oscillations of a Disc

There are 3 figures and 2 Soviet references.

ASSOCIATION: Institut kristallografii AN SSSR
(Institute of Crystallography of the Ac.Sc.USSR)

SUBMITTED: September 14, 1957

Card 3/3

SOV/70-3-6-21/25

AUTHORS: Shuvalov, L.A. and Tavger, B.A.

TITLE: The Symmetry of the Magnetostrictive Properties of Crystals (Simmetriya magnitostriktsionnykh svoystv kristallov)

PERIODICAL: Kristallografiya, 1958, Vol 3, Nr 6, pp 756-759 (USSR)

ABSTRACT: Magnetostriction is understood as being an even-power deformation as distinct from piezo-magnetism which should be a linear effect. Six different equations are possible relating the deformations r_{ik} or the stresses s_{ik} with the magnetic field H_i, the induction B_i or the magnetisation I_i, namely:

r_{ik} (or s_{ik}) = L_{iklm} $H_l H_m$ (or $B_l B_m$ or $I_l I_m$) where L_{iklm} can be called the magnetostrictive constants. The effect is of importance only for ferro-magnetics so that the most useful form is $r_{ik} = L_{iklm} I_l I_m$. The limitations on L imposed by the crystal symmetry are examined. For classes 1 and $\bar{1}$, it has 21 components and the symmetry of the tensor is $\bar{1}$, the direction of the magnetic moment is arbitrary. For the other classes:

Class	Direction of mag.mom.	Symmetry of tensor.	Cpts.
2, $\underline{2}$, m, $\underline{m}$, 2/m, $\underline{2}/\underline{m}$	along 2 or $\underline{m}$ or perp.	2/m	13
	to $\underline{2}$ or m		9
222, 2$\underline{mm}$, $\underline{2}$mm, mmm	along 2 or perp. to $\underline{2}$ or m	2mm	7
		$\bar{6}$	7
Card1/2 3, $\bar{3}$, 6 4, $\bar{4}$, 4/m	along axis	4/m	
	along axis		

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24(3) SOV/48-22-12-27/33

AUTHORS: Shuvalov, L. A., Kachkacheva, M. M., Rusakov, L. Z., Zheludev, I. S.

TITLE: On Low-Temperature Polarization of Ceramics From Barium Titanate (Nizkotemperaturnaya polyarizatsiya keramiki iz titanata bariya)

PERIODICAL: Izvestiya Akademii nauk SSSR .Seriya fizicheskaya, 1958, Vol 22, Nr 12, pp 1516 - 1519 (USSR)

ABSTRACT: The present paper deals with tests of the polarization and the sub-polarization of $BaTiO_3$ ceramics in rhombic phase. This polarization has been called the low-temperature polarization. These tests were made on the assumption that it might be possible to obtain higher values of piezomoduli of ceramics in the rhombic and tetragonal phase by such a polarization in relatively small fields. The low-temperature sub-polarization in the rhombic phase causes an increase of the values of the piezomoduli of ceramics in the tetragonal phase. On heating under the field the subpolarization causes an increase of the d_{31} by an average 15%. In spite of the noticeable ageing the d_{31}

Card 1/2

value remains by more than 10% above the initial value. Heating under the field after polarization in the rhombic phase prevents the d_{31} from becoming smaller during the transition into the tetragonal phase. The polarization in the rhombic phase with heating under the field requires smaller fields than a polarization at room temperature. The d_{31} values do not become smaller, but in numerous cases even higher than with hot polarization. For this reason the low-temperature polarization can be used along with hot polarization, particularly when the latter is not feasible, for example on account of strong conductivity in the proximity of the Curie (Kyuri) point. The authors thank V. G. Zatevakhina for his collaboration. There are 1 figure, 3 tables, and 5 references, 4 of which are Soviet.

ASSOCIATION: Institut kristallografii Akademii nauk SSSR (Institute of Crystallography, Academy of Sciences USSR) TsNILP Komiteta po radioelektronike Soveta Ministrov SSSR (TsNILP of the Committee on Radioelectronics, Cabinet Council, USSR)

SOV/70-4-1-26/26

AUTHORS: Shuvalov, L.A., Aleksandrov, K.S. and Zheludev, I.S.

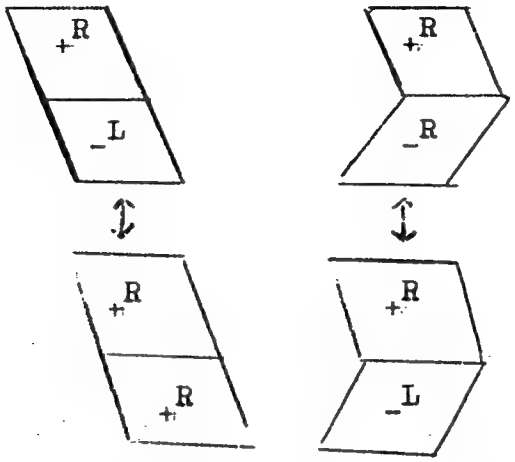
TITLE: On the Question of the Domain Structure of Crystals of Triglycine Sulphate (K voprosu o domennoy strukture kristallov triglitsinsul'fata)

PERIODICAL: Kristallografiya, 1959, Vol 4, Nr 1, pp 130 - 132 (USSR)

ABSTRACT: $(NH_2CH_2COOH)_3.H_2SO_4$ is isomorphous with the selenate and the fluoberyllate and several other ferroelectrics which pass from the class $2/m \rightleftarrows 2$ at the Curie point. Possible ways in which the domains can be twinned are discussed here. Besides the symmetry of the transition $2/m \rightleftarrows 2$ the only other assumption is that in the ferroelectric state with no imposed field, the mosaic crystal has no overall moment. Two and only two mutual orientations of the domains are found. These are:

Card1/3

On the Question of the Domain Structure of Crystals of Triglycine Sulphate



unpolarised

polarised

Card2/3

"+" indicates polarisation towards the observer and "-" the opposite. The left possibility has the symmetry 2 (the symmetry of a single domain) in the polarised state whereas the right possibility has the symmetry 2/m . In

On the Question of the Domain Structure of Crystals of Triglycine Sulphate

the latter case the moduli d_{14}, d_{25} and d_{36} vanish. If the left variant obtains then only one enantiomorphous form remains after the transition. Here, in contradistinction to the case of Rochelle salt, mechanical strains do not accompany the polarisation. Such a transition, from one enantiomorph to the other, has not been reported before. The right variant would also have similar transitions. Both types of transitions are expected to exist. There are 1 figure and 8 references, 3 of which are Soviet, 3 English and 2 international.

ASSOCIATION: Institut kristallografii AN SSSR (Institute of Crystallography of the Ac.Sc., USSR)
Krasnoyarskiy institut fiziki AN SSSR (Krasnoyarsk Institute of Physics of the Ac.Sc., USSR)

SUBMITTED: October 21, 1958

SOV/70-4-3-18/32

AUTHOR: Shuvalov, L.A.

TITLE: Ferromagnetic Phase Transitions and Crystal Symmetry

PERIODICAL: Kristallografiya, 1959, Vol 4, Nr 3, pp 399-409 (USSR)

ABSTRACT: Transitions from the ferroelectric state to the normal state are accompanied by changes in symmetry and have been studied in a number of cases. Principles have been laid down for the changes permissible (the author and I.S. Zheludev - Ref 1) and observations have always been found to be in agreement with these. The treatment is now extended to ferromagnetic phases. M is the direction of spontaneous magnetisation. The black and white (Shubnikov) symmetry groups, which contain anti-symmetry elements denoted by underlining, are used. For each of the 32 crystal classes are listed the crystallographic (Fedorov) and magnetic (Shubnikov) symmetry classes which a crystal of one of the initial classes assumes on becoming less symmetrical through being magnetised along one of the directions:

⟨100⟩ ⟨111⟩ ⟨110⟩ ⟨hK0⟩ ⟨hkk⟩ ⟨hhk⟩ or ⟨hkl⟩

Card1/3

Ferromagnetic Phase Transitions and Crystal Symmetry

The crystallographic ferromagnetic classes coincide with the known pyromagnetic classes, namely:

6:m, 6, $\bar{6}$, 3:m, 3, 4:m, 4, $\bar{4}$, 2:m, 2, m, $\bar{2}$, 1 (13 in all). Including the Shubnikov classes there are 31 ferromagnetic classes. The other 59 classes of magnetic symmetry represent anti-ferromagnetics. The crystallographic symmetry group of any ferromagnetic phase is either equal to its magnetic group or is a sub-group of index 2 of its magnetic group. All the groups are for spontaneous magnetisation only: an imposed field may lower the symmetry. The tables also show between which ferromagnetic phases second-order phase transitions are possible.
Acknowledgments are made to I.S. Zheludev, Academician A.V. Shubnikov and A.A. Gusev.
There are 4 tables and 28 references, 16 of which are Soviet, 1 French, 9 English and 2 international.

Ferromagnetic Phase Transitions and Crystal Symmetry SOV/70-4-3-18/32

ASSOCIATION: Institut kristallografii AN SSSR (Institute of Crystallography of the Ac.Sc., USSR)

SUBMITTED: December 19, 1958

Card 3/3

S/030/60/000/05/36/056
B015/B008

AUTHOR: Shuvalov, L. A.

TITLE: New Studies on Piezoelectricity

PERIODICAL: Vestnik Akademii nauk SSSR, 1960, No. 5, pp. 92-94

TEXT: B. M. Vul discovered piezoelectric properties in ceramic barium titanate and thus caused a rapid progress in research in this new field of physics. The 3rd Conference on piezoelectricity held in Moscow from January 26 to 30, 1960 revealed the promotion of research in this field in the USSR. The Conference was convened by the Institut kristallografii (Institute of Crystallography) and the Fizicheskiy institut im. P.N. Lebedeva (Institute of Physics imeni P. N. Lebedev). It was attended by 300 delegates from academic institutions, schools of higher learning and the otraslevyye nauchno-issledovatel'skiye instituty (Scientific Branch Research Institutes). The following reports are mentioned: G. A. Smolenskiy, V. A. Bokov, and I. G. Ismailzade reported on the lately discovered piezo- and antipiezoelectrics. V. A. Koptsik and V. P. Konstantinova dealt with problems of the growth of crystals of new piezoelectrics soluble in water and the

Card 1/3

investigation of their domain structure and properties. I. S. Zheludev, Ye. I. Mamonov, and I. S. Rez reported on the crystals of the triglycine-sulfate in connection with their application possibilities. A. L. Khodakov and O. P. Kramarov described the method of the production of monocrystals of the perovskite piezoelectrics. V. L. Ginzburg and V. L. Indenbom reported on the microscopic and general thermodynamic theory of piezo- and antipiezoelectrics. G. S. Zhdanov, Yu. N. Venevtsev, and A. I. Agranovskaya reported on radiographic investigations. N. N. Kraynik and G. S. Zhdanov mentioned the theoretical computation of the internal fields in perovskite piezo- and antipiezoelectrics. S. V. Bogdanov and Ye. V. Sinyakov reported on the electrical conductivity of $BaTiO_3$, $Pb_2Nb_2O_6$ and the solid solutions on the basis of $BaTiO_3$. E. V. Stauer, L. A. Shuvalov, and V. A. Yurin dealt with problems connected with the investigation of various new phenomena of piezoelectrics. B. M. Vul, S. V. Bogdanov, T. N. Verbitskaya, and R. Ye. Pasynkov reported on the investigation of the properties of new two-component and three-component solid solutions on the basis of $BaTiO_3$, $Pb_2Nb_2O_6$, $PbTiO_3$, and $PbZrO_3$.

New Studies on Piezoelectricity

S/030/60/000/05/36/056
B015/B008

Ye. G. Smazhevskaya and P. L. Strelets reported on the achievements of the industrial production of new piezoelectric ceramic products. The Conference decided to request the Prezidium Akademii nauk SSSR (Presidium of the Academy of Sciences USSR) to set up an sektsiya po segnetoelektrikam (Section for Piezoelectrics) at the Komissiya po poluprovodnikam (Commission for Semiconductors). It was decided to hold the next Conference on piezoelectricity in Leningrad early in 1962.

Card 3/3

SHUVALOV, L.A.

Asymmetry of the pulse polarization reversal of triglycine sulfate accompanying changes in pulses of opposite polarity. Kristallografiia 5 no.2:282-287 Mr-Ap '60. (MIRA 13:9)

1. Institut kristallografii AN SSSR.
(Glycine) (Polarization (Electricity))
(Ferroelectric substances)

S/070/60/005/003/016/024/XX
E132/E460

AUTHOR: Shuvalov, L.A.

TITLE: Pulsed Polarization Reversal in Crystals of Deuterated Triglycine Sulphate

PERIODICAL: Kristallografiya, 1960, Vol.5, No.3, pp.409-414

TEXT: Experimental data are given on the repeated polarization reversal produced in deuterated triglycine sulphate by periodic bipolar voltage pulses and the dependence of the polarization current and the time for polarization on the pulse amplitude, on the temperature and on the repetition rate. The characteristics of ordinary triglycine sulphate (TGS) and the deuterated material (DTGS) are compared. As DTGS has a Curie point of 60°C compared with 49°C for TGS the properties of the former are of potential technical importance. Plates of DTGS 1 x 1 x 0.02 cm cut perpendicular to the polar axis and silvered on the largest faces were used. 10 μ sec pulses in alternate direction were applied at repetition rates of 0 to 10 Kc/s, at temperatures from 0 to 60°C and with field strengths up to 6 KV/cm. A list is given of the properties of TGS and DTGS under identical conditions. From this it can be seen that DTGS (as for all other deuterated materials) is

Card 1/3

S/070/60/005/003/016/024/XX
E132/E460

Pulsed Polarization Reversal in Crystals of Deuterated Triglycine Sulphate

substantially harder (ferroelectrically) than TGS its hydrogen analogue. The critical field E_α in DTGS is 1.5 times greater than in TGS (there is the same ratio between E_α and the coercivity E_c in the two materials) and consequently the threshold field (the beginning of switch-over) is also higher. The higher value of P_s in DTGS is also favourable but the specific switch-over resistance in DTGS is also about 1.5 times greater and so for the same field strengths and plate thicknesses i_{max} in DTGS is significantly less and t_{max} significantly higher than in TGS. However, if thinner plates of DTGS are used it is possible to obtain identical values of i_{max} and t_{max} for the same voltage. Considering that DTGS has a wider temperature range in which it can be used and a lower temperature dependence of the characteristics of the pulse polarization reversal in the room temperature region, it can be concluded DTGS can sometimes be advantageously substituted for TGS. Acknowledgments to V.P.Konstantinova and

Card 2/3

9,2180

84999
S/048/60/024/010/008/033
B013/B063

AUTHORS: Konstantinova, V. P., Sil'vestrova, I. M., Shuvalov, L.A., and Yurin, V. A.

TITLE: Production and Piezoelectric Properties of Crystals of Deuterized Triglycin Sulfate

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 10, pp. 1203-1205

TEXT: Monocrystals of deuterized triglycin sulfate (DTGS) were obtained from monocrystals of ordinary triglycin sulfate (TGS) dissolved in D_2O. The solution was boiled, whereupon large DTGS monocrystals with a weight of up to 100 g were bred from it. The external form of the DTGS crystals is the same as in TGS crystals. In their symmetry they belong, like TGS crystals, to the monocline system. The form of the domain boundaries in DTGS crystals is shown in Fig. 1. Measurements have shown that the dependencies of all of the characteristics of reversion of polarization on temperature, on the field, on the frequency, and other quantities (Figs. 2-5) in DTGS crystals exhibit a qualitative similarity with the

Card 1/2

84999

Production and Piezoelectric Properties of Crystals of Deuterized Triglycin Sulfate

S/048/60/024/010/008/033
B013/B063

corresponding dependencies of TGS crystals. Fig. 6 illustrates the relations $i_{max}/S = f(E)$ and $1/\tau_{max} = f(E)$, taken at different temperatures. (S - electrode area, E - field strength during the pulse). Fig. 7 gives the temperature dependence of mobility μ, as calculated from formula $\mu = \frac{d}{\tau_{max}(E - E_\alpha)}$. (d - thickness of plate, E_α - activation field).

Owing to the fact that DTGS crystals, compared with TGS crystals, are usable within a much wider temperature range, and that their characteristics at room temperature exhibit a lesser temperature dependence, they can be used in the same cases as the TGS crystals in spite of their considerable electrical hardness. The authors thank I. S. Zheludev for his discussion of results, and Ye. M. Akulenok, K. A. Pluzhnikov, and L. N. Kurnakovskaya for assistance given in the experiments. The present paper was read at the Third Conference on Piezoelectricity which took place in Moscow from January 25 to 30, 1960. There are 7 figures and 8 references: 5 Soviet.

ASSOCIATION: Institut kristallografii Akademii nauk SSSR (Institute of Crystallography of the Academy of Sciences USSR)

Card 2/2

85002

9,2180

S/048/60/024/010/011/033
B013/B063

AUTHORS: Shuvalov, L. A., Likhacheva, Yu. S.

TITLE: Damping of Oscillations of Piezoelectric Resonators Made of Piezoelectric Monocrystals

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 10, pp. 1216 - 1224

TEXT: The authors describe some experiments they carried out for studying the damping in piezoelectric resonators. They studied resonators made of ordinary Rochelle salt, Rochelle salt irradiated with gamma rays, and triglycine sulfate (Figs. 3-7). They used a method based on a direct measurement of the damping of the characteristic mechanical oscillations of the resonator. The experimental arrangement is schematically represented in Fig.1. A typical damping observed on the screen of an oscilloscope is shown in Fig.2. The samples had the shape of rectangular ingots and were cut out of monocrystals bred by the ordinary method, and were tested for longitudinal stress-strain oscillations. It was found

Card 1/3

Damping of Oscillations of Piezoelectric Resonators Made of Piezoelectric Monocrystals

S/048/60/024/010/011/033
B013/B063

that of the 45° cuts of Rochelle salt, only those of the X 45° cut are piezoelectric, since their actual modulus of elasticity contains the anomalous constant s_{44}. Furthermore, their oscillations may be accompanied by a periodic hysteretic re-orientation of the domains. Resonators made of triglycine sulfate ingots whose largest area is perpendicular to the polar axis Y are also piezoelectric. The great temperature dependence of δ and its high peak near the Curie point at $E_{=} = 0$ can be explained for piezoelectric resonators (Figs. 3 and 7) by the great temperature dependence of the domain mobility and its tendency to infinity near the Curie point. When applying the field $E_{=}$ to the piezoelectric resonator (in the direction of the polar axis), the re-orientation of the domains during oscillations is first promoted (Figs. 4 and 5). Thus, δ increases and reaches a maximum with $E_{=} \approx E_{coerc}$ at the maximum of $\partial P/\partial E$. The functions $\delta = \varphi(E_{=})$ and $\delta = f(t)$ are similar to the functions of the reversible dielectric constant ε and of the dielectric

Damping of Oscillations of Piezoelectric Resonators Made of Piezoelectric Monocrystals

S/048/60/024/010/011/033
B013/B063

susceptibility of $E_{=}$ and t. The relationship between damping and the behavior of the domain structure in piezoelectric resonators irradiated with gamma rays is very illustrative. As is shown by the preliminary investigations of piezoelectric resonators made of triglycine sulfate (Fig.7), their damping and the dependence of δ on $E_{=}$ are low compared to resonators of the 45^{o} cut of Rochelle salt. This may be ascribed to the crystallographic difference between the domain structures. The authors thank K. A. Pluzhnikov for measurements; I. S. Zheludev, M. I. Yaroslavskiy, and V. A. Yurin for discussions; and Ye. G. Bronnikova and A. I. Yaroslavskiy for their assistance in preparing the samples. The present paper was read at the Third Conference on Piezoelectricity, which took place in Moscow from January 25 to 30, 1960. There are 7 figures and 16 references: 12 Soviet.

ASSOCIATION: Institut kristallografii Akademii nauk SSSR (Institute of Crystallography of the Academy of Sciences USSR)

Card 3/3

85868

S/048/60/024/011/004/036
B006/B056

24.7700 (1043, 1143, 1559)

AUTHORS: Konstantinova, V. P., Sil'vestrova, I. M., Shuvalov, L. A., and Yurin, V. A.

TITLE: Production of and Some Ferroelectric Properties of Lithium Hydroselenite

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960 Vol. 24, No. 11, pp. 1318 - 1323

TEXT: The present paper is a reproduction of a lecture delivered on the 3rd Conference on Ferroelectricity, which took place in Moscow from January 25 to 30, 1960. Lithium hydroselenite (denoted by LHS), $LiHSeO_3 \cdot H_2SeO_3$ form monocline crystals of the space group P_n. Already in Ref.1 it has been identified as ferroelectric, and some data were given. In the present paper the authors first describe the synthesis and chemical properties of this compound. Fig.1 shows the solubility of LHS as a function of temperature (straight line), from which it may be seen that this crystal may be grown in the usual manner by temperature

Card 1/3

Production of and Some Ferroelectric Properties of Lithium Hydroselenite

S/048/60/024/011/004/036
B006/B056

decrease. A monocrystal of 100 g grown by the authors is shown in Fig.2. The fusing point of LHS was found to be at 110.5°C, density - $\varrho = 3.185$ g/cm^3, the angle of monoclinity was 105°. The orientation of the crystallographic axes and the position of the main faces are shown in Fig.3. Fig.4 shows the various hysteresis loops, which are found to exist in the individual crystallographic directions of LHS. Also the direction-dependence of the dielectricity constant ε_{33} (broken line) and the spontaneous polarization P_s in the cleavage face are shown. Figs.5-6 show ε, the coercitive force E_c and the spontaneous polarization as a function of temperature. It was found that ε and P_s increase with increasing temperature, whereas E_c decreases. Fig.7 shows ε as a function of the electric field strength at various frequencies. ($E_\sim$) in all cases has a maximum. The authors thank V. A. Frolova, L. N. Kurkovskaya, and K. A. Pluzhnikov for their collaboration and I. S. Zheludev for valuable advice. There are 7 figures, 1 table, and 5 references: 3 Soviet and 2 US.

Card 2/3

85868

S/048/60/024/011/004/036
B006/B056

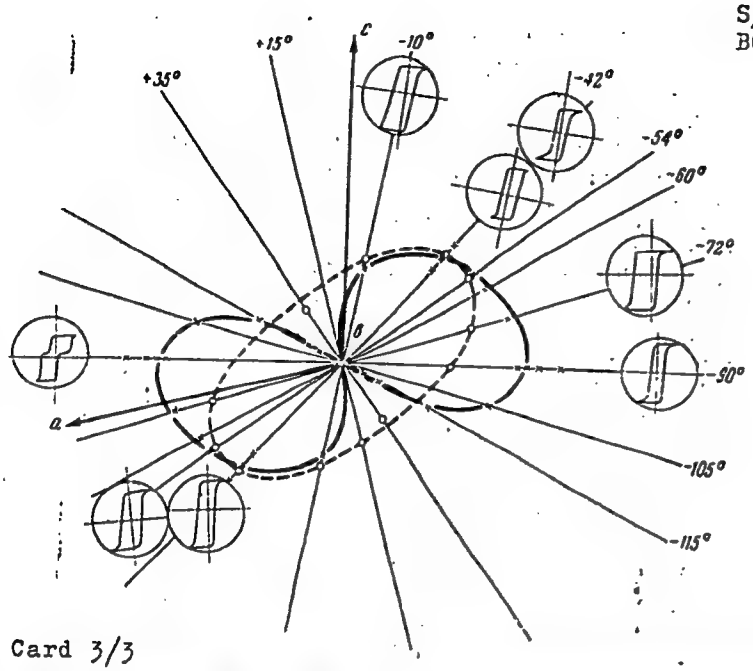


Fig.4

Card 3/3

9.2181 (2303, 3203)
6.1340 (2103, 3103)

85894
S/048/60/024/011/030/036
B006/B060

AUTHOR: Shuvalov, L. A.

TITLE: Some Characteristics of the Pulsed Reversal of Polarity of Seignettcelectric Crystals

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 11, pp. 1416 - 1420

TEXT: This is the reproduction of a lecture delivered at the Third Conference on Ferroelectricity which took place in Moscow from January 25 to 30, 1960. The author gives some experimental results concerning the pulsed reversal of polarity of ordinary and deuterized triglycine sulfate (TGS and DTGS, respectively). Fig. 1 shows the block diagram of the measuring system. The specimens were 1 cm^2 large platelets, their thickness ranging between 0.15 and 0.30 mm, which were cut out of the crystal in perpendicular to the seignetto-electric axis. Cross-shaped silver electrodes were applied by vacuum sputtering. The quantities measured were the maximum switching

Card 1/7

current i_{max}, the duration of increase of the switching pulse τ_{max}, as well as the temperature variation Δt appearing with switching. In contrast with the theory and experiments of other researchers (Refs. 1, 6), according to whom the functions $i_{max}/S = f_1(E)$ (S - area of the electrode) and $1/\tau_{max} = f_2(E)$ for TGS and DTGS should coincide at an appropriate scale the author has found already in earlier measurements (pulse duration 20 μsec) for different temperatures that with growing field strengths f_1 deviates from f_2 in the upward direction. This can be explained by the fact that the polarity reversal in the volume between the electrodes improves with an increase of E, or also by assuming the form of the switching pulse to change. Measurement results are illustrated in four diagrams (Figs. 2,3). The author finally thanks V. A. Pluzhnikov for his assistance and I. S. Zheludev for discussions. There are 3 figures and 8 references: 4 Soviet, 3 US, and 1 German.

Card 2/7

85894

Some Characteristics of the Pulsed Reversal of Polarity of Seignetto-electric Crystals

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B006/B060

ASSOCIATION: Institut kristallografii Akademii nauk SSSR (Institute of Crystallography of the Academy of Sciences USSR)

Card 3/7

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B006/B060

Fig. 1

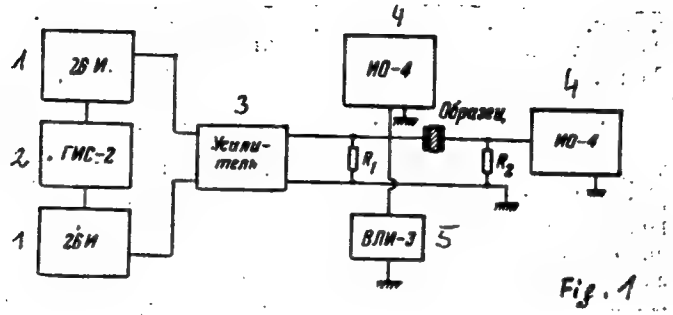

Fig. 1

Card 4/7

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B006/B060

Fig. 2

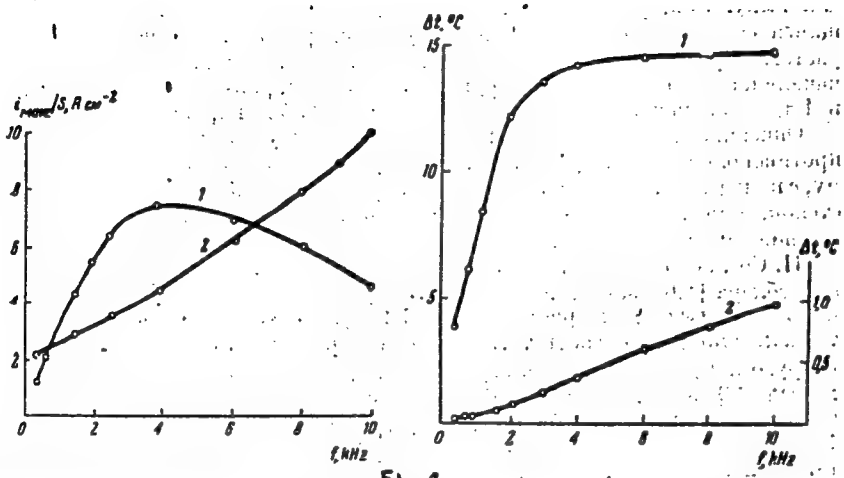

Fig. 2

Card 5/7

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B006/B060

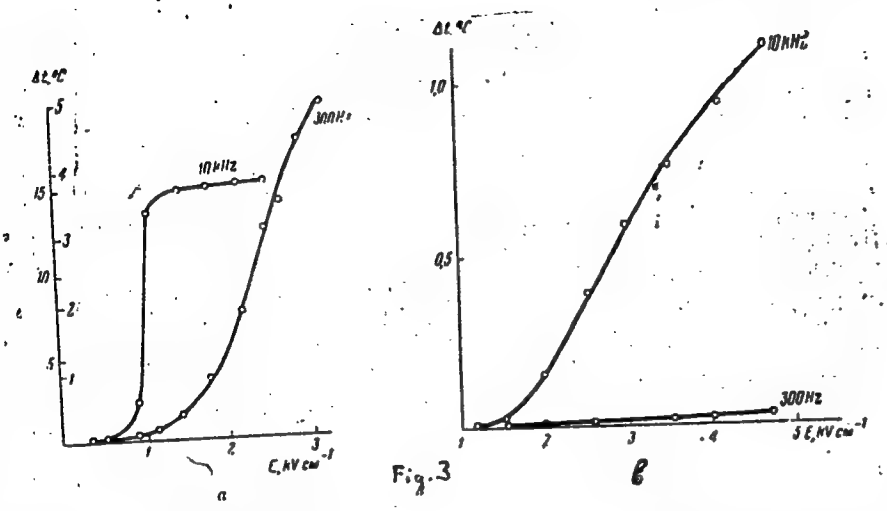

Fig. 3

Card 6/7

85894

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Legend to Fig. 1: Block diagram of measuring device. (1) generators producing bipolar square pulses, type 26 И (26 I); (2) generators of the type ГИС-2 (GIS-2) serving as long delay line; (3) amplifier; (4) oscilloscopes; (5) peak voltmeter; R_1 = 50 ohms, R_2 = ~10 - 70 ohms.

Legend to Fig. 2: $i_{max}/S = f_1(f)$ and $\Delta t = f_2(f)$ for two TGS specimens. 1, 2.1 x 2.1 x 0.28 mm; 2, 0.5 x 0.4 x 0.19 mm volume between the electrodes. Initial temperature 20°C.

Legend to Fig. 3: Heating Δt as a function of the field strength. a - size as in Fig. 2 curve 1, b - as for curve 2. Initial temperature is 20°C.

Card 7/7

SHUVALOV, L. A.

Cand Phys-Math Sci, Diss -- "Problems of crystallography and crystallophysics of ferroelectrics". Moscow, 1961. 14 pp, 22 cm (Moscow State U imeni M. V. Lomonosov, Phys Faculty), 150 copies, Not for sale (KL, No 9, 1961, p 176, No 24269). [61-54120]

22790

S/070/61/006/003/001/009
E081/E441

24.7100 (1153, 1136, 1142)

AUTHORS: Shuvalov, L.A. and Sonin, A.S.

TITLE: On the question of the crystallography of antiferroelectrics

PERIODICAL: Kristallografiya, 1961, Vol.6, No.3, pp.323-330

TEXT: On the basis of a formal investigation of the configuration of the antipolarization vectors, the crystallographic classification, the geometry of the domain structure, the possible point groups and the symmetry characteristics of antiferroelectrics are considered. An antiferroelectric crystal is formed as a result of phase transition from a paraelectric phase by slight distortion of the initial pseudosymmetrical structure. This structure can be represented by an even number of sublattices such that the polarizations are equal but oppositely directed in pairs. In the simplest type of antiferroelectric (for example tungsten oxide, WO_3), there are two sublattices, and an antiferroelectric of this type may belong to any crystallographic class, except the cubic classes. An antiferroelectric has a centre of symmetry only if there is a centre in the paraelectric phase, and if the paraelectric

Card 1/3

On the question of ...

phase is piezoelectric, the antiferroelectric phase is also piezoelectric. Thus, neither the presence of a centre of symmetry nor the absence of piezoelectricity is a certain indication of antiferroelectricity. Twinning is observed in many antiferroelectrics, and the separate components of the twin form antiferroelectric domains. Consideration of spontaneous polarization and antipolarization shows that an antiferroelectric with two sublattices cannot be formed by transition from a paraelectric phase belonging to one of the classes: 1, $\bar{2}$, 2, m, 3, 3 : 2, 3·m, 3 : m. The possible symmetry classes corresponding to two-and three-dimensional antipolarization and to transition from the paraelectric to the antiferroelectric phase are also discussed. Finally the polarization scheme and symmetry properties of crystals which can simultaneously show ferroelectric and antiferroelectric behaviour are examined. Acknowledgments are expressed to I.S.Zheludev and V.A.Koptsik for advice and discussion. There are 3 figures and 22 references: 12 Soviet-bloc and 10 non-Soviet-bloc. The four most recent reference to English language publications read as follows: G.Shirane, R.Pepinsky, Phys.Rev., 91,

On the question of ...

S/070/61/006/003/001/009
E081/E441

218, 1953; L. Cross, B.J.Nickolson, Philos. Mag., 46, 453, 1955;
E.A.Wood, W.J.Merz, B.T.Matthias, Phys.Rev., 87, 544, 1954;
F.Jona, G.Shirane, F.Mazzi, R.Pepinsky, Phys. Rev., 105, 849, 1957.

ASSOCIATION: Institut kristallografii AN SSSR
(Institute of Crystallography AS USSR)

SUBMITTED: October 22, 1960

Card 3/3

SHUVALOV, L.A.; PLUZHNIKOV, K.A.

Distinctive elastic and internal friction properties near the Curie point in triglycine sulfate crystals. Kristallografiia 6 no.5:692-699 S-O '61. (MIRA 14:10)

1. Institut kristallografii AN SSSR.
(Crystallography) (Glycine)

6136
S/070/62/007/002/001/022
E132/E160

24,7100

AUTHORS: Shuvalov, L.A., and Belov, N.V.

TITLE: The symmetry of crystals in which ferromagnetic and ferroelectric properties occur simultaneously

PERIODICAL: Kristallografiya, v.7, no.2, 1962, 192-194

TEXT: There are 90 black and white point groups of which 31 permit the occurrence of a magnetic polarisation M and a different 31 permit electric polarisation P. There are 10 groups common to the two categories, namely: 62'2'; 6; 32'; 3; 42'2'; 4; 22'2'; 2; 2'; 1. These are subgroups of ∞ 2'2'. There are 3 further groups: mm'2'; m; and m', where the vectors M and P are constrained to be perpendicular. In all of the 10 groups mentioned first, except 2' and 1 where M and P may make any angle with each other, M and P must be parallel. The 101 space groups corresponding to these 13 point groups have been listed (Ref.4: N.N. Neronova, N.V. Belov, Kristallografiya, v.4, 1959, 807-812). The above has assumed that M and P belong to the same antisymmetry group, which is not necessarily the case. The relevant groups of double

Card 1/2

SHUVALOV, L.A.

Antisymmetry and its modifications. Kristallografiia 7 no.4: 520-525 Jl-Ag '62. (MIRA 15:11)

1. Institut kristallografii AN SSSR.
(Crystallography)

SHUVALOV, L.A.

Limit groups of double antisymmetry. Kristallografiia 7 no.6:822-825 N-D '62. (MIRA 16:4)

1. Institut kristallografii AN SSSR.
(Crystallography)

41576
S/020/62/146/004/008/015
B104/B102

AUTHORS: Shuvalov, L. A., Minayeva, K. A.

TITLE: Anomalies of elasticity and internal friction near the antiferromagnetic Curie point of $PbMg_{1/2}W_{1/2}O_3$

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 146, no. 4, 1962, 808 - 809

TEXT: A twin resonator with quartz exciter was used to measure the elastic plasticity s_{11} and the logarithmic decrement δ in polycrystalline specimens (25·5·1.8 mm) of the new antiferroelectric $PbMg_{1/2}W_{1/2}O_3$ (G. A. Smolenskiy, A. I. Agranovskaya, V. A. Isupov, Fiz. tverd. tela, 1, 6, 990 (1959); N. N. Kraynik, A. I. Arganovskaya, Fiz. tverd. tela, 2, 1, 70 (1960); G. A. Smolenskiy, N. N. Kraynik, A. I. Agranovskaya, Fiz. tverd. tela, 3, 3, 981 (1961)). The estimates showed that the finite dimensions of the specimens did not influence the measurement values. At 20°C the specimens had a density of 7.52 g/cm^3 and were practically nonporous. Between 33 and 38°C a strong anomaly was observed in the temperature dependence of s_{11} and δ (Fig. 1). The maximum of the dielectric

Card 1/2

SHUVALOV, L. A.

"Crystallophysical Classification of Ferroelectrics."

report presented a t the Symposium on Ferroelectricity and Ferromagnetism, Leningrad, 30 May - 5 June 1963.

SHUVALOV, L. A.

"Crystallophysical classification of ferroelectrics, ferroelectric-phase transitions and special features of domain structure and some physical properties of ferroelectrics of different classification classes."

report submitted for 6th Gen Assembly, Intl Union of Crystallography, Rome, 9 Sep 63.

Inst Crystallography, AS USSR, Moscow.

SHUVALO, L. A.

"Crystallophysical classification of ferroelectrics, ferroelectric-phase transitions and special features of domain structure and some physical properties of ferroelectrics of different classification classes."

report presented at the Symposium on Phase Transitions in Solids, 6th General Assembly, Intl. Union of Crystallography, Rome, Italy, 16-18 Sep 1963.

(Karpov Institute of Physical Chemistry, Moscow, USSR)

L 12810-63 EWP(j)/EPF(c)/EWT(l)/EWT(m)/BDS AFFTC/ASD/ESD-3
-47/Pt-4 GG/RM/WW/JW/IJP(C)
ACCESSION NR: AP3000791 S/0070/63/008/003/0482/0483

AUTHOR: Belyayev, L. M.; Vlokh, O. G.; Gil'verg, A. B.; Dobrzhanskiy, G. F.; Malesov, G. B.; Shamburov, V. A.; Shuvalov, L. A.

TITLE: Linear electrooptical effect in crystals of hexamethylenetetramine (urotropin) C sub 6 H sub 12 N sub 4

SOURCE: Kristallografiya, v. 8, no. 3, 1963, 482-485

TOPIC TAGS: hexamethylenetetramine, urotropin, electrooptical effect, ZnS, CuCl, electrooptical constant

ABSTRACT: This study was undertaken be[illegible] the only two commonly employed crystals with sufficient electrooptical effect for practical use (ZnS and CuCl) are generally of unsatisfactory quality or are difficult to obtain. The authors obtained hexamethylenetetramine by sublimation in a vacuum and found it to form well-developed rhombic dodecahedrons. In polarized light the specimens exhibit a dark cross in the middle of the field and a black border about the [illegible] four light areas in the centers of the four quadrants. [illegible] was impressed at right angles to the direction of light propagation, voltages up to 10 kv, the light patches became dark and the dark areas lightened. This effect proved to be linear, the change depending on the applied voltage. Because of this

Card 1/2

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ACCESSION NR: AP3000791

linear effect it was impossible to determine precisely the electrooptical [illegible] the
A preliminary approximation was made, however, by measuring total [illegible]
the crystal was between crossed polarizing plates and by comparing [illegible]
the voltage applied. Similar measurements were made through the central part of
the dark cross. Results show hexamethylenetetramine to be as satisfactory as
previously used material. It also has two other pass bands in the infrared region
of the spectrum. Orig. art. has: 2 figures.

ASSOCIATION: Institut kristallografii AN SSSR (Institute of Crystallography, AN SSSR)

SUBMITTED: 02Feb63 DATE ACQ: 21Jun63 ENCL: 00

SUB CODE: 00 NO REF SOV: 000 OTHER: 000

Card 2/2

SHUVALOV, L.A.

Crystallophysical classification of ferroelectric substances, ferroelectric phase transitions, and characteristics of the domain structure and certain physical properties of ferroelectric substances of various classes. Kristallografiia 8 no.4:617-624 Jl-Ag '63.
(MIRA 16:9)

1. Institut kristallografii AN SSSR.
(Ferroelectric substances)

BELOV, K.P., doktor fiz.-matem.nauk; SHUVALOV, L.A., kand.fiz.-matem.nauk

Symposium on ferromagnetism and ferroelectricity at Leningrad.
Vest. AN SSSR 33 no.9:82-84 S '63. (MIRA 16:9)
(Dielectrics) (Ferromagnetism)

S/0070/64/009/003/0363/0372

ACCESSION NR: AP4039397

AUTHORS: Shuvalov, L. A.; Ivanov, N. R.

TITLE: Changes in optical activity of ferroelectric crystals during polarization reversal in the crystals

SOURCE: Kristallografiya, v. 9, no. 3, 1964, 363-372

TOPIC TAGS: ferroelectric material, polarization plane, electric field, mechanical stress

ABSTRACT: The authors seek a means to expand the list of ferroelectrics that will exhibit changes in sign of optical activity through the effect of an electrical field. They also consider possible changes in sign of optical activity of such crystals by means of applied mechanical stress, and they investigate the amount of rotation of the polarization plane (without reversal of sign). They analyze ferroelectric phases in enantiomorphic and plane (m and 2mm) classes. In a table they list all the ferroelectric phase transitions to optically active classes and show the possibility of change in sign of optical activity. They point out that it has already been demonstrated that polarization reversal of ferroelectric crystals is

Card 1/2

ACCESSION NR: AP4039397

always possible, in principle, by mechanical stress if it is possible by the presence of an electrical field. It is concluded that a whole series of ferroelectric crystals may show reversal of optical activity due to an electrical field or to mechanical stress, but that the effect is absent in others. If the ferroelectric phase is present in a crystal, optical activity is not only possible, it is necessary. This furnishes a guide to follow in looking for crystals with the effect of polarization reversal. The effects thus produced may be widely useful. A narrow light beam may distinguish domains by differences in optical activity even when ordinary optical methods fail. The integral effect of rotating the polarization plane may also determine the degree of unipolarity in a crystal. It may further aid in effecting a new method of light modulation. Orig. art. has: 3 figures and 1 table.

ASSOCIATION: Institut kristallografii AN SSSR (Institute of Crystallography AN SSSR)

SUBMITTED: 03Sep63

ENCL: 00

SUB CODE: OP, SS, EC

NO REF SOV: 009

OTHER: 006

Card 2/2

SHUVALOV, L.A.; SHIROKOV, A.M.

Nonlinear elasticity of Rochelle salt crystals due to resonance vibrations. Kristallografiia 9 no.6:886-892 N-D '64. (MIRA 18:2)

1. Institut kristallografii AN SSSR.

ACCESSION NR: AP4030639 S/0048/64/028/004/0660/0665

AUTHOR: Shuvalov, L.A.

TITLE: A crystallophysical classification of ferroelectrics and its applications /Report, Symposium on Ferromagnetism and Ferroelectricity held in Leningrad 30 May to 5 June 1963/

SOURCE: AN SSSR. Izv. Ser.fiz., v.28, no.4, 1964, 660-665

TOPIC TAGS: ferroelectricity, ferroelectric classification, crystallophysical classification

ABSTRACT: The author has previously proposed a classification of ferroelectric materials based essentially on the types of domain structure of which the various materials are capable. He calls this a "crystallophysical" classification to distinguish it from crystallographic or crystallochemical classifications. The crystallophysical classification is expected to be of particular value because of the great importance of domain structure in determining the properties of ferroelectric materials. The crystallophysical classification distinguishes four classes of ferroelectric materials (actually phases) according to the following double dichotomy: the

Card 1/2